CLAIMS

Therefore, having thus described the invention, at least the following is claimed:

1. A transmitter, comprising:

    (a) a tone ordering element, wherein the tone ordering element is capable of assigning bits to a plurality of tones; and

    (b) a bit and gain table, wherein the bit and gain table is capable of designating that within a portion of the plurality of tones, a variable plurality of bits is assigned to each of the plurality of tones, and wherein the variable plurality of bits assigned to each of the plurality of tones is different from the variable plurality of bits assigned to each adjacent tone.

2. The transmitter of claim 1, wherein the portion of the plurality of tones has an original bit density that is the same for each of the plurality of tones, and wherein the bit and gain table is capable of designating a reduction of the original bit density by one on alternate tones within the portion of the plurality of tones.

3. The transmitter of claim 1, wherein the bit and gain table is capable of designating the assignment of the variable plurality of bits to each of the plurality of tones by boosting the power on a first group of tones within the portion of the plurality of tones and lowering the power on a second group of tones within the plurality of tones.

4. The transmitter of claim 1, wherein the portion of the plurality of tones is selected based on correlated noise affecting the portion of the plurality of tones.

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1   5. The transmitter of claim 1, wherein the bit and gain table is capable of being

2 dynamically determined by a receiver.

3   6. The transmitter of claim 1, wherein a portion of the variable plurality of bits is

4 a portion of a DMT symbol.

1   7. A transmitting system, comprising:

2   (a) means for tone ordering, wherein the means for tone ordering is capable of

3 assigning bits to a plurality of tones; and

4   (b) means for communicating bit and gain assignment information, wherein the

5 means for communicating bit and gain assignment information is capable of designating

6 that within a portion of the plurality of tones, a variable plurality of bits is assigned to

7 each of the plurality of tones, and wherein the variable plurality of bits assigned to each of

8 the plurality of tones is different from the variable plurality of bits assigned to each

9 adjacent tone.

1   8. The transmitting system of claim 7, wherein the portion of the plurality of

2 tones has an original bit density that is the same for each of the plurality of tones, and

3 wherein the means for communicating bit and gain assignment information is capable of

4 designating a reduction of the original bit density by one on alternate tones within the

5 portion of the plurality of tones.

1   9. The transmitting system of claim 7, wherein the means for communicating bit

2   and gain assignment information is capable of designating the assignment of the variable

3   plurality of bits to each of the plurality of tones by boosting the power on a first group of

4   tones within the portion of the plurality of tones and lowering the power on a second

5   group of tones within the portion of the plurality of tones.

1   10. The transmitting system of claim 7, wherein the portion of the plurality of

2   tones is selected based on correlated noise affecting the portion of the plurality of tones.

1   11. The transmitting system of claim 7, wherein the means for communicating bit

2   and gain assignment information is capable of being dynamically determined by a

3   receiver.

1   12. The transmitting system of claim 7, wherein a portion of the plurality of bits

2   is a portion of a DMT symbol.

1   13. A method for transmitting data, comprising the steps of:

2   (a) receiving bits and relative gain information, wherein the bits and relative gain

3   information designates a variable plurality of bits to be assigned to each of a plurality of

4   tones, and wherein the variable plurality of bits to be assigned to each of the plurality of

5   tones is different from the variable plurality of bits to be assigned to each adjacent tone;

6   and

7   (b) assigning bits to the plurality of tones based on the bits and relative gain

8   information.

1   14. The method of claim 13, wherein the plurality of tones has an original bit

2   density that is the same for each of the plurality of tones, and wherein the bits and relative

3   gain information designates a reduction of the original bit density by one on alternate

4   tones.

1   15. The method of claim 13, wherein the assignment of bits to the plurality of

2   tones is accomplished by boosting the power on a first portion of the plurality of tones

3   and lowering the power on a second portion of the plurality of tones.

1   16. The method of claim 13, wherein the plurality of tones is selected based on

2   correlated noise affecting the plurality of tones.

1   17. The method of claim 13, wherein bits and relative gain information is

2   calculated by a receiver.

1   18. The method of claim 13, wherein the bits and relative gain information is

2   dynamically calculated by a receiver.

1   19. The method of claim 13, wherein a portion of the plurality of bits is a portion

2   of a DMT symbol.

20. A computer readable medium, comprising:

(a) logic for receiving bits and relative gain information, wherein the bits and relative gain information designates a variable plurality of bits to be assigned to each of the a plurality of tones, and wherein the variable plurality of bits to be assigned to each of the plurality of tones is different from the variable plurality of bits to be assigned to each adjacent tone; and

(b) logic for assigning bits to tones based on the bits and relative gain information.

21. The computer readable medium of claim 20, wherein the plurality of tones had an original bit density that is the same for each of the plurality of tones, and wherein the bits and relative gain information designates a reduction of the original bit density by one on alternate tones.

22. The computer readable medium of claim 20, wherein the assignment of bits to the plurality of tones is accomplished by boosting the power on a first portion of the plurality of tones and lowering the power on a second portion of the plurality of tones.

23. The computer readable medium of claim 20, wherein the plurality of tones is selected based on correlated noise affecting the plurality of tones.

24. The computer readable medium of claim 20, wherein the bits and relative gain information is calculated by a receiver.

25. The computer readable medium of claim 20, wherein bits and relative gain information is dynamically calculated by a receiver.

1   26. The computer readable medium of claim 20, wherein a portion of the plurality

2   of bits is a portion of a DMT symbol.

1   27. A receiver, comprising:

2   (a) a convolutional decoder, the convolutional decoder cable of outputting

3   convolutionally decoded tone ordered interleaved data; and

4   (b) a bit ordering element, wherein the bit ordering element is capable of re-

5   ordering the convolutionally decoded tone ordered interleaved data.

6   28. The receiver of claim 27, wherein a transmitter supplies the data to the

7   receiver and the transmitter codes the data with a tone ordering element and a bit and gain

8   table, wherein the tone ordering element is capable of assigning bits to a plurality of tones

9   and the bit and gain table is capable of designating that within a portion of the plurality of

10   tones, a variable plurality of bits is assigned to each of the plurality of tones, and wherein

11   the variable plurality of bits assigned to each of the plurality of tones is different from the

12   variable plurality of bits assigned to each adjacent tone.

1   29. The receiver of claim 28, wherein the portion of the plurality of tones has an

2   original bit density that is the same for each of the plurality of tones, and wherein the bit

3   and gain table is capable of designating a reduction of the original bit density by one on

4   alternate tones within the portion of the plurality of tones.

1   30. The receiver of claim 28, wherein the bit and gain table is capable of

2   designating the assignment of the variable plurality of bits to each of the plurality of tones

3   by boosting the power on a first group of tones within the portion of the plurality of tones

4   and lowering the power on a second group of tones within the plurality of tones.

1   31. The receiver of claim 28, wherein the portion of the plurality of tones is

2   selected based on correlated noise affecting the portion of the plurality of tones.

1   32. The receiver of claim 28, wherein the bit and gain table is capable of being

2   dynamically determined by a receiver.

1   33. The receiver of claim 28, wherein a portion of the variable plurality of bits is

2   ~~a portion of a DMT symbol.~~